

## CLAIMS

1. A method for distributing bid grants to access switch outputs in the switching of information, the method comprising:
- at each switch input, accepting information packets
- 5 addressing a plurality of switch outputs;
- channeling the information packets into a plurality of channels;
- in response to bid submissions from the switch inputs, receiving bid grants accessing switch outputs, for selected switch inputs;
- 10 and,
- for each selected switch input, selecting channels to accept the bid grants.
2. The method of claim 1 wherein selecting channels to accept the bid grants includes:
- 15 for each selected switch input, determining the available channels having information packets addressed to the bid grant switch outputs; and,
- distributing bid grants in response to the available channels.
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3. The method of claim 2 further comprising:
- supplying up to a first plurality of bid grants accessing each switch output, for distribution among available channels in selected switch inputs; and,

wherein receiving bid grants accessing switch outputs includes the selected switch inputs receiving up to a first plurality of bid grants accessing each switch output.

- 5                   4.     A method for distributing bid grants to access switch outputs in the switching of information, the method comprising:
- for each of a second plurality of switch inputs, accepting information packets addressing a second plurality of switch outputs;
- supplying a first plurality of switch crossbars, each including
- 10   a plurality of parallel routed switch inputs and a plurality of parallel routed switch outputs to transfer information packets to switch outputs;
- channeling the information packets into a third plurality of channels;
- in response to bid submission from the switch inputs,
- 15   supplying up to a first plurality of bid grants accessing each switch output, for distribution among available channels in selected switch inputs;
- for selected switch inputs, receiving bid grants accessing switch outputs;
- 20                   for each selected switch input, determining the available channels having information packet addressed to the bid grant switch outputs; and,
- distributing bid grants in response to the number of available channels, where selected switch inputs receive up to a first
- 25   plurality of bid grants accessing each switch output.

5. The method of claim 4 wherein supplying up to a first plurality of bid grants accessing each switch output includes supplying a bid grant for each crossbar, to access each switch output.

5 6. The method of claim 5 further comprising:  
in each channel, queuing information packets by output address, in up to a second plurality of queues per channel.

7. The method of claim 6 wherein receiving bid grants  
10 accessing switch outputs includes the selected switch inputs receiving bid grants accessing specified switch outputs, through specified crossbars;  
and,

wherein distributing bid grants in response to the available channels includes selecting least recently used available channels for the  
15 specified switch outputs.

8. The method of claim 7 further comprising:  
establishing an ordered channel priority list for each specified switch output; and,  
20 wherein selecting the least recently used available channels for the specified switch outputs includes selecting the least recently used available channel in response to the ordered channel priority list.

9. A method for distributing bid grants to access switch  
25 outputs in the switching of information, the method comprising:

at each of a second plurality of switch inputs, accepting  
information packets addressing a second plurality of switch outputs;

supplying a first plurality of switch crossbars, each including  
a plurality of parallel routed switch inputs and a plurality of parallel

5 routed switch outputs to transfer information packets to switch outputs;

channeling the information packets into a third plurality of  
channels;

in each channel, queuing information packets by switch  
output, in up to a second plurality of queues per channel;

10 in response to bid submissions from the switch inputs,  
supplying up to one bid grant for each crossbar accessing each switch  
output, for distribution among available channels in selected switch  
inputs;

for selected switch inputs, receiving bid grants accessing  
15 specified switch outputs, through specified crossbars;

for each selected switch input, determining available  
channels having information packets addressed to the bid grant switch  
outputs;

establishing an ordered channel priority list for each  
20 specified switch output; and,

distributing bid grants in response to the available channels,  
where least recently used available channels are selected for the specified  
switch outputs in response to the channel priority list in at least one grant  
cycle per decision cycle.

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10. The method of claim 9 wherein distributing bid grants in response to the available channels in at least one grant cycle per decision cycle includes, for at least one specified switch output, selecting the highest priority available channel in a first grant cycle.

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11. The method of claim 10 wherein distributing bid grants in response to the available channels in at least one grant cycle per decision cycle includes each specified switch output selecting the highest priority available channel in a first grant cycle.

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12. The method of claim 10 wherein distributing bid grants in response to the available channels in at least one grant cycle per decision cycle includes other specified switch outputs selecting the highest priority available channel in subsequent grant cycles.

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13. The method of claim 10 wherein distributing bid grants in response to the available channels in at least one grant cycle per decision cycle includes:

establishing a switch output priority system; and,  
20 resolving contention between specified switch outputs for a commonly selected channel in response to the priority system.

14. The method of claim 10 wherein establishing an ordered channel priority list for each specified switch output includes:

25 following the selection of a first channel, moving the first channel to the end of the priority list; and,

selecting the available channel closest in succession to the second channel in a subsequent decision cycle.

15           15.     The method of claim 14 further comprising:  
establishing a decision cycle including at least one grant  
cycles; and,  
wherein distributing bid grants in response to the available  
channels includes selecting available channels for specified switch outputs  
every decision cycle.

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16.     A system for distributing switch output access bid  
grants in the transfer of information across a switch, the system  
comprising:

15           a channel assembler having a plurality of inputs, where each  
input accepts information packets addressing a plurality of switch  
outputs, the channel assembler channeling the information packets  
received at each input into a plurality of channels, and supplying the  
channelized information packets at a plurality of outputs, the channel  
assembler also having a channel status output to communicate the  
20     contents of each channel; and,

          a grant arbiter having an input connected to the channel  
arbiter channel status output and an input to receive bid grants accessing  
switch outputs for selected channel assembler outputs, the grant arbiter  
selecting channels to accept the bid grants in each selected channel  
25     assembler output.

17. The system of claim 16 wherein the grant arbiter determines the number of available channels in each selected channel assembler output, with information packet addresses matching the bid grant switch outputs, and distributes bid grants in response to the  
5 number of available channels.

18. The system of claim 17 wherein the grant arbiter accepts up to a first plurality of bid grants accessing each switch output for distribution across each of the channel assembler outputs.  
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19. The system of claim 18 further comprising:  
a switch including a first plurality of crossbars, each with a plurality of parallel routed switch inputs and a plurality of parallel routed switch outputs to transfer information packets to switch outputs; and,  
15 wherein the grant arbiter accepts a bid grant for each crossbar to access each switch output.

20. The system of claim 19 wherein the switch includes a second plurality of switch inputs and a second plurality of switch outputs;  
20 and,

wherein the channel assembler includes a second plurality of outputs, and wherein the channel assembler channels information packets into a third plurality of channels per output.

21. A system for distributing switch output access bid grants in the transfer of information across a switch, the system comprising:

a channel assembler having a second plurality of inputs,  
5 where each input accepts information packets addressing a second plurality of switch outputs, the channel assembler channeling the information packets received at each input into a third plurality of channels, queuing the information packets by switch output, and supplying the channelized information packets at a plurality of outputs,  
10 the channel assembler also having a channel status output to communicate the contents of each channel;

a switch including a first plurality of crossbars with a second plurality of parallel routed switch inputs and a second plurality of parallel routed switch outputs to transfer information packets to switch outputs;  
15 and,

a grant arbiter having an input connected to the channel arbiter channel status output and an input to receive bid grants accessing switch outputs for selected information inputs, the grant arbiter determining the number of available channels in each selected channel  
20 assembler output, with information packet addresses matching the bid grant switch outputs, and distributing up to one bid grant for each crossbar accessing each switch output.

22. The system of claim 21 wherein the grant arbiter  
25 receives bid grants for accessing specified switch outputs through



specified crossbars, and wherein the grant arbiter selects the least recently used available channels for the specified switch outputs.

23. The system of claim 22 wherein the grant arbiter  
5 includes an ordered channel priority list for each specified switch output, and wherein the grant arbiter selects the least recently used available channel in response to the ordered channel priority lists.

24. The system of claim 23 wherein the grant arbiter  
10 selects available channels in at least one grant cycle per decision cycle.

25. The system of claim 24 wherein the grant arbiter  
selects available channels in at least one grant cycle per decision cycle by  
selecting the highest priority available channel, for at least one specified  
15 switch output, in a first grant cycle.

26. The system of claim 25 wherein the grant arbiter  
selects available channels in at least one grant cycle pre decision cycle by  
selecting the highest priority available channel for each specified switch  
20 output in a first grant cycle.

27. The system of claim 25 wherein the grant arbiter  
selects available channels in at least one grant cycle pre decision cycle by  
selecting the highest priority available channel for other specified switch  
25 outputs in subsequent grant cycles.

28. The system of claim 25 wherein the grant arbiter  
selects available channels in at least one grant cycle pre decision cycle by  
establishing a switch output priority system, and resolving contention  
between specified switch outputs for a commonly selected channel in  
5 response to the priority system.

29. The system of claim 25 wherein the grant arbiter  
creates an ordered channel priority list for each specified switch output,  
and following the acceptance of a first channel, moves the first channel to  
10 the end of the list; and,

wherein the grant arbiter nominates the available channel  
closest to the top of the list in a subsequent decision cycle.

30. The system of claim 29 further comprising:  
15 a timer having an output to supply a decision cycle signal  
including at least one grant cycle; and,

wherein the grant arbiter selects available channels for  
specified switch outputs every decision cycle.